Modular	LAN Campu	us Core Switch		
	1		L	
ID		Primary Attribute	Secondary Attribute	Specification
1	1	Chassis	Туре	Modular
	2		19 Inch Rack Mounting	Required
	3		Packet Processor Redundancy	Required (Online Insertion/Removal)
	4		Packet Processor	Layer-3 Switching: Non-Blocking Layer-2 Switching: Non-Blocking
	5		Control Plane Redundancy Support	Required
	6		Cooling Redundancy Support	Required
	7		Power Supply Redundancy Support (1:1)or (N+1)	Required
	8		Input Power Options	AC
	9		Online Insertion/Removal Hot-Pluggable	Required
	10		Multi-Chassis Link Aggregation	Required
2	1	Operating System Features	Protocols switched in hardware	IPv4, IPv6, IGMP Snooping, IPv6 MLD v1 & v2
	2		Layer 3 Protocols & Routing Features	- IPv4, IPv6,ICMP,OSPF, BGP - Virtual Router Redundancy Protocol (VRRP) - Routing Engine Fast failover - Switching load sharing configurable per packet or per session, and per session is configuration with L3 address and L4 ports - Protocol Independent Multicast (PIM) v1 & v2
	3		OSPF Requirements	- IPv4 Open Shortest Path First (OSPF) versions 2 - IPv6 Open Shortest Path First (OSPF) versions 3 - MD5 authentication - Configurable areas, ABRS, and ASBRS - Configurable area types: normal (LSAS 1-5), stubby (LSAS 1-4), totally stubby (LSAS 1-2), Not-So-Stubby Area (NSSA) (LSAS 1-2), Not-So-Stubby Area (NSSA) (LSAS 1-4 & 7), and NSSA totally stubby (LSAS 1-2 & 7) - Configurable router ID - Configurable hello packet interval - Configurable priority for DR and BDR - Configurable priority for DR and BDR - Configurable per interface network types (P2P, broadcast, NBMA, and virtual links) - Configurable cost per interface - Configurable cost multiplier - Ability to redistribute static routes and other protocol routes using access lists and route maps
	4		BGPv4 Requirements	- Multiprotocol Border Gateway Protocol (BGP) for IPv4 and IPv6 - MD5 authentication - Use all standard attributes - Ability to enable or disable synchronization - Configurable local preference per neighbor - Configurable multi-exit discriminator (MED) per neighbor - Configurable standard and extended communities
	5		Required L2 Features	802.1q, Per-port broadcast, multicast, and unicast storm control, 802.3ad (LACP), Link-Layer Discover Protocol, Jumbo Ethernet Frames with MTU up to 9000 bytes

	6	Port Security	- 802.1x Support - MAC Authentication Bypass - Dynamic VLAN Assignment - Configurable number of MAC Addresses allowed per port - Configurable actions to take when violation occurs - Ability to configure MAC address or addresses allowed per port - Ability to learn and stick a MAC Address per port
	7	QoS Features	- 802.1p class-of-service(CoS) classification - Differentiated Services Code Point (DSCP) classification - Support ingress classification, policing, and marking per port - Support egress queuing/scheduling - 15,000 source and 15,000 destination QoS ACL entries (processed in hardware)
	8	Access Control Lists	- Access lists in hardware - Support for access lists source and destination L2 MAC address, Ethernet types, and SAPs - Support for access lists source and destination L3 addresses with masks and L4 port numbers - Support for prefix lists - Ability to apply L3 access list to L2 interfaces/ports - Ability to police (rate limit) per port, per port channel, per VLAN - 15,000 source and 15,000 destination ACL entries (processed in hardware)
9	9	NTP Support	- Version 3 or greater Required - Configurable NTP Peer and Server Associations - Configurable NTP Authentication - Configurable NTP Access Restrictions - Configurable Source IP Address for NTP packets - Configurable Timezone/Offset - Configurable automatic recurring daylight savings time - Configurable per Interface
	10	Unidirectional Link failure Detection	Required
	11	802.1d Required Spanning Tree Features	- Must be able to disable spanning tree per port - Ability to transition immediately to forwarding state per port on edge ports with 802.1d/s/w - Ability to disable topology change notifications per port on edge ports with 802.1d/s/w - STP cost configurable per port (0 to 240) 802.1d & 802.1t - STP priority configurable per VLAN (0 to 61,440) 802.1d & 802.1t - Ability to prevent rogue bridges from becoming the STP root - Ability to prevent an alternate port or a root port from assuming a designated port role due to the absence of BPDUs Ability to configure STP edge ports to disable upon receiving a BPDU

142		I	Controlly of AAA / Bully Broad
12		Network Management	- Centralized AAA w/ Role Based Authorization, Syslog, SNMP v2c, v3, SNMP Traps, SSH, Telnet, Radius or similar - Ability to disable telnet, ftp, http, https - IPv6 Support - Secure console port with roles based AAA authentication - Configurable Console & VTY timeout - Ability to define and apply IP access control lists to VTY sessions - Out of Band Ethernet Management Port - Optional - DNS support for resolution of user- defined device names
13		SNMP Features	- Support for, SNMPv2C, & SNMPv3 - Support for traps that is an agent on the switch to send an unsolicited notifications to the SNMP manager for a configured event Configurable source IP address or interface for traps. Supports both read-only (RO) and read-write (RW) community strings - Ability to restrict each community string to specific IP addresses independently - Ability to configure different SNMP versions for each SNMP manager - Support for multiple RO and RW community strings
			- Support for multiple SNMP profiles
14		Port Mirroring or cimilar	
14		Port Mirroring or similar	Required
15		Remote Port Mirroring or similar	Required Required
15 16		Remote Port Mirroring or similar Configuration File Management	Required Required TFTP, FTP
15 16 17		Remote Port Mirroring or similar Configuration File Management Software Image Management	Required Required TFTP, FTP TFTP, FTP
15 16 17 18 19		Remote Port Mirroring or similar Configuration File Management Software Image Management VLAN Support Data Traffic Rate Limiting	Required Required TFTP, FTP
15 16 17 18 19		Remote Port Mirroring or similar Configuration File Management Software Image Management VLAN Support	Required Required TFTP, FTP TFTP, FTP >= 1000 VLAN'S - Source and Destination IP - Layer 4 TCP and UDP - Source and Destination MAC Configurable Voice-VLAN
15 16 17 18 19		Remote Port Mirroring or similar Configuration File Management Software Image Management VLAN Support Data Traffic Rate Limiting	Required Required TFTP, FTP TFTP, FTP >= 1000 VLAN's - Source and Destination IP - Layer 4 TCP and UDP - Source and Destination MAC
15 16 17 18 19	Line-cards / Port Interfaces	Remote Port Mirroring or similar Configuration File Management Software Image Management VLAN Support Data Traffic Rate Limiting VOIP Features	Required Required TFTP, FTP TFTP, FTP >= 1000 VLAN's - Source and Destination IP - Layer 4 TCP and UDP - Source and Destination MAC Configurable Voice-VLAN - Configurable log history size - Configurable logging severity
15 16 17 18 19 20 21		Remote Port Mirroring or similar Configuration File Management Software Image Management VLAN Support Data Traffic Rate Limiting VOIP Features Message Logging Buffer Throughput to Backplane	Required Required TFTP, FTP TFTP, FTP >= 1000 VLAN's - Source and Destination IP - Layer 4 TCP and UDP - Source and Destination MAC Configurable Voice-VLAN - Configurable log history size - Configurable logging severity - Configurable log message time stamps
15 16 17 18 19 20 21		Remote Port Mirroring or similar Configuration File Management Software Image Management VLAN Support Data Traffic Rate Limiting VOIP Features Message Logging Buffer	Required Required TFTP, FTP TFTP, FTP >= 1000 VLAN's - Source and Destination IP - Layer 4 TCP and UDP - Source and Destination MAC Configurable Voice-VLAN - Configurable log history size - Configurable logging severity - Configurable log message time stamps Non-Blocking option available
15 16 17 18 19 20 21 3 1 2		Remote Port Mirroring or similar Configuration File Management Software Image Management VLAN Support Data Traffic Rate Limiting VOIP Features Message Logging Buffer Throughput to Backplane Port per ASIC (Oversubscription)	Required Required TFTP, FTP TFTP, FTP >= 1000 VLAN's - Source and Destination IP - Layer 4 TCP and UDP - Source and Destination MAC Configurable Voice-VLAN - Configurable log history size - Configurable logging severity - Configurable log message time stamps Non-Blocking option available 1:1 Option Available - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet
15 16 17 18 19 20 21 3 1 2 3		Remote Port Mirroring or similar Configuration File Management Software Image Management VLAN Support Data Traffic Rate Limiting VOIP Features Message Logging Buffer Throughput to Backplane Port per ASIC (Oversubscription) Interface Speed Options Media Flexibility Options	Required Required TFTP, FTP TFTP, FTP TFTP, FTP >= 1000 VLAN'S - Source and Destination IP - Layer 4 TCP and UDP - Source and Destination MAC Configurable Voice-VLAN - Configurable log history size - Configurable log message time stamps Non-Blocking option available - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet - 10 Gbps Ethernet
15 16 17 18 19 20 21 3 1 2 3		Remote Port Mirroring or similar Configuration File Management Software Image Management VLAN Support Data Traffic Rate Limiting VOIP Features Message Logging Buffer Throughput to Backplane Port per ASIC (Oversubscription) Interface Speed Options	Required Required TFTP, FTP TFTP, FTP >= 1000 VLAN's - Source and Destination IP - Layer 4 TCP and UDP - Source and Destination MAC Configurable Voice-VLAN - Configurable log history size - Configurable loging severity - Configurable log message time stamps Non-Blocking option available 1:1 Option Available - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet - 10 Gbps Ethernet MMF >= 220m, SMF >= 10km, IEEE 802.3z-compliant 1000BASE-SX, 100BASE-LX , 100BASE-TX (RJ45), 10GBASE-SR, 10GBASE-LR, 10GBASE-ER,
15 16 17 18 19 20 21 3 1 2 3		Remote Port Mirroring or similar Configuration File Management Software Image Management VLAN Support Data Traffic Rate Limiting VOIP Features Message Logging Buffer Throughput to Backplane Port per ASIC (Oversubscription) Interface Speed Options Media Flexibility Options Configurable Egress Queues	Required Required TFTP, FTP TFTP, FTP >= 1000 VLAN's - Source and Destination IP - Layer 4 TCP and UDP - Source and Destination MAC Configurable Voice-VLAN - Configurable log history size - Configurable loging severity - Configurable log message time stamps Non-Blocking option available 1:1 Option Available - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 10 Gbps Et

High Den	sity Modul	ar LAN Access Switch		
	T=	In	I	la 16 11
ID .	Ref. No.	Primary Attribute	Secondary Attribute	Specification
1	1	Chassis	Туре	Modular
	2		19 Inch Rack Mounting	Required
	3		User Access Port Count	=> 144 copper or fiber
	4		System Throughput	Non-Blocking
	5			High Availability (critical areas):
				Required
			Packet Processor Redundancy	(Online Insertion/Removal)
				Non-Critical Areas: Not Required
	6			Layer-3 Switching: Non-Blocking
			Packet Processor	Layer-2 Switching: Non-Blocking
	7			High Availability (critical areas):
	ľ			Required
			Control Plane Redundancy Support	Non-Critical Areas: Not Required
				Non entited / weds. Not negative
	0		Cooling Redundancy Support	Dogwisad
	8			Required
	9		Power Supply Redundancy Support (1:1)or (N+1)	Required
	10	 	Input Power Options	AC
<u> </u>	11		Online Insertion/Removal Hot-Pluggable	Required
2	1	Operating System Features	Protocols switched in hardware	IPv4, IPv6, IGMP Snooping, IPv6 MLD v1
				& v2
	2		Hot Swappable Insertion / Removal Support	Required
	3			- IPv4, IPv6,ICMP,OSPF, BGP
				- Virtual Router Redundancy Protocol
				(VRRP)
				- Switching load sharing configurable
				per packet or per session, and per
			Layer 3 Protocols & Routing Features	session is configuration with L3 address
			.,	•
				and L4 ports
				- Protocol Independent Multicast (PIM)
				v1 & v2
	_			ID 4.0 Ch Dull First (OCDE)
	4			- IPv4 Open Shortest Path First (OSPF)
				versions 2
				- IPv6 Open Shortest Path First (OSPF)
				versions 3
				- MD5 authentication
				- Configurable areas, ABRS, and ASBRs
				- Configurable area types: normal (LSAs
				1-5), stubby (LSAs 1-4), totally stubby
				(LSAs 1-2), Not-So-Stubby Area (NSSA)
				(LSAs 1-4 & 7), and NSSA totally stubby
				(LSAs 1-2 & 7)
				- Configurable router ID
				- Configurable hello packet interval
			OSPF Requirements	
				- Configurable router dead interval
				- Configurable priority for DR and BDR
				- Configurable per interface network
				types (P2P, broadcast, NBMA, and
				virtual links)
				- Configurable cost per interface
				- Configurable cost multiplier
				- Ability to redistribute static routes and
1				other protocol routes using access lists
				and route maps
				and route maps
1	5			- Multiprotocol Border Gateway
				Protocol (BGP) for IPv4 and IPv6
				- MD5 authentication
1				- Use all standard attributes
1				- Ability to enable or disable
				synchronization
			BGPv4 Requirements	1 -
			3 S. T Trequirements	- Configurable local preference per
				neighbor
				- Configurable multi-exit discriminator
				(MED) per neighbor
				- Configurable standard and extended
				communities

1.			
6		Required L2 Features	802.1q, Per-port broadcast, multicast, and unicast storm control, 802.3ad (LACP), Link-Layer Discover Protocol, Jumbo Ethernet Frames with MTU up to 9000 bytes
7		Port Security	- 802.1x Support - MAC Authentication Bypass - Dynamic VLAN Assignment - Configurable number of MAC Addresses allowed per port - Configurable actions to take when violation occurs - Ability to configure MAC address or addresses allowed per port - Ability to learn and stick a MAC Address per port
8		QoS Features	- 802.1p class-of-service(CoS) classification - Differentiated Services Code Point (DSCP) classification - Support ingress classification, policing, and marking per port - Support egress queuing/scheduling
9		Access Control Lists	- Access lists in hardware - Support for access lists source and destination L2 MAC address, Ethernet types, and SAPs - Support for access lists source and destination L3 addresses with masks and L4 port numbers - Support for prefix lists - Ability to apply L3 access list to L2 interfaces/ports - Ability to police (rate limit) per port, per port channel, per VLAN
10		NTP Support	- Version 3 or greater Required - Configurable NTP Peer and Server Associations - Configurable NTP Authentication - Configurable NTP Access Restrictions - Configurable Source IP Address for NTP packets - Configurable Timezone/Offset - Configurable automatic recurring daylight savings time - Configurable per Interface
11		Unidirectional Link Failure Detection	Required
12		802.1d Required Spanning Tree Features	- Must be able to disable spanning tree per port - Ability to transition immediately to forwarding state per port on edge ports with 802.1d/s/w - Ability to disable topology change notifications per port on edge ports with 802.1d/s/w - STP cost configurable per port (0 to 240) 802.1d & 802.1t - STP priority configurable per VLAN (0 to 61,440) 802.1d & 802.1t - Ability to prevent rogue bridges from becoming the STP root - Ability to prevent an alternate port or a root port from assuming a designated port role due to the absence of BPDUsAbility to configure STP edge ports to disable upon receiving a BPDU

Infe Support Secure console port with roles based AAA authentication Secure console port with roles based AAA authentication Configuration Configura				1
Support for traps that is an agent on the switch to send an unspicited in the switch send an unspicited configurable source in address or onligered event. Configurable source in address or interface for traps. Supports both read-only (R0) and read-write (RW) community strings Supports both read-only (R0) and read-write (RW) community strings Supports both read-only (R0) and read-write (RW) community strings Supports both read-only (R0) and read-write (RW) community strings Support for multiple R0 and RW Support for multiple R0 and RW Support for multiple R0 and R			Network Management	Authorization, Syslog, SNMP v2c, v3, SNMP Traps, SSH, Telnet, Radius or similar - Ability to disable telnet, ftp, http, https - IPv6 Support - Secure console port with roles based AAA authentication - Configurable Console & VTY timeout - Ability to define and apply IP access control lists to VTY sessions - Out of Band Ethernet Management Port - Optional - DNS support for resolution of user-
Remote Port Mirroring or Similar Required	14	14	SNMP Features	- Support for traps that is an agent on the switch to send an unsolicited notifications to the SNMP manager for a configured event. - Configurable source IP address or interface for traps. Supports both read-only (RO) and readwrite (RW) community strings - Ability to restrict each community string to specific IP addresses independently - Ability to configure different SNMP versions for each SNMP manager -Support for multiple RO and RW community strings
Remote Port Mirroring or Similar Required		45	Dest Advantage of Charles	Dec. 1st I
17 18 19 20 20 20 20 20 20 20 2				
Software Image Management				
VLAN Support >= 1000 VLAN's		17	Configuration File Management	TFTP, FTP
VLAN Support >= 1000 VLAN's		18	Software Image Management	TFTP, FTP
20 21 22 22 23 24 26 27 28 29 29 20 20 20 20 20 20 20 20 20 20 20 20 20				>= 1000 VLAN's
22 Configurable log history size - Configurable logging severity - Configurable logging severity - Configurable logging severity - Configurable logging severity - Configurable log message time stamps Description				- Source and Destination IP - Layer 4 TCP and UDP
Configurable log history size		21	VOID Features	Configurable Voice-VLAN
Port per ASIC (Oversubscription) 1:1 Available option required - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (SFP) 4 Uplink Port Speed Options >= Qty 2 - 1 Gbps or 10 Gbps MMF >= 220m, SMF >= 10km, IEEE 802.3z-compliant 1000BASE-SX, 1000BASE-IX, 100BASE-IX, (RJ45), 10GBASE-SR, 10GBASE-IX, 10GBASE-IX, 10GBASE-IX, 10GBASE-IX, 100BASE-IX Configurable Egress Queues >= 8 per port including Strict Priority - 802.3af support (full power on all ports) - 802.3at support (full power on all ports) - Configurable Power levels per port - Visibility into PoE power use				- Configurable log history size
Port per ASIC (Oversubscription) 1:1 Available option required - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (SFP) 4 Uplink Port Speed Options >= Qty 2 - 1 Gbps or 10 Gbps MMF >= 220m, SMF >= 10km, IEEE 802.3z-compliant 1000BASE-SX, 1000BASE-IX, 100BASE-IX, (RJ45), 10GBASE-SR, 10GBASE-IX, 10GBASE-IX, 10GBASE-IX, 10GBASE-IX, 100BASE-IX Configurable Egress Queues >= 8 per port including Strict Priority - 802.3af support (full power on all ports) - 802.3at support (full power on all ports) - Configurable Power levels per port - Visibility into PoE power use				
- 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (SFP) 4 Uplink Port Speed Options >= Qty 2 - 1 Gbps or 10 Gbps MMF >= 220m, SMF >= 10km, IEEE 802.3z-compliant 1000BASE-SX, 100BASE-LX , 100BASE-LX , 100BASE-TX (RJ45), 10GBASE-R, 10GBASE-ER, 10GBASE-ER, 100BASE-TX (RJ45), 10	2	1 Instanta / Dark Line Town	Throughout to Dool Live	New Disables and the control of
Access Port Speed Options - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (SFP) Uplink Port Speed Options >= Qty 2 - 1 Gbps or 10 Gbps MMF >= 220m, SMF >= 10km, IEEE 802.3z-compliant 1000BASE-SX, 1000BASE-IX, 100BASE-SX, 1000BASE-IX, 100BASE-TX (RJ45), 10GBASE-SR, 10GBASE-IR, 10GBASE-ER, 1000BASE-T Configurable Egress Queues >= 8 per port including Strict Priority - 802.3af support (full power on all ports) - 802.3at support (full power on all ports) - Configurable Power levels per port - Visibility into PoE power use	3		<u> </u>	5 1
MMF >= 220m, SMF >= 10km, IEEE 802.3z-compliant 1000BASE-SX, 1000BASE-LX , 100Base-TX (RJ45), 10GBASE-SR, 10GBASE-LR, 10GBASE-ER, 1000BASE-T Configurable Egress Queues >= 8 per port including Strict Priority - 802.3af support (full power on all ports) - 802.3at support (full power on all ports) - Configurable Power levels per port - Visibility into PoE power use	3		<u> </u>	5 1
MMF >= 220m, SMF >= 10km, IEEE 802.3z-compliant 1000BASE-SX, 1000BASE-LX , 100Base-TX (RJ45), 10GBASE-SR, 10GBASE-LR, 10GBASE-ER, 1000BASE-T Configurable Egress Queues >= 8 per port including Strict Priority 7 - 802.3af support (full power on all ports) - 802.3at support (full power on all ports) - 802.3at support (full power on all ports) - Configurable Power levels per port - Visibility into PoE power use	3	2	Port per ASIC (Oversubscription)	1:1 Available option required - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet
802.3z-compliant 1000BASE-SX, Media Flexibility Support 1000BASE-LX , 100Base-TX (RJ45), 10GBASE-SR, 10GBASE-LR, 10GBASE-ER, 1000BASE-T Configurable Egress Queues >= 8 per port including Strict Priority - 802.3af support (full power on all ports) - 802.3at support (full power on all ports) - Configurable Power levels per port - Visibility into PoE power use	3	3	Port per ASIC (Oversubscription) Access Port Speed Options	1:1 Available option required - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (SFP)
- 802.3af support (full power on all ports) - 802.3at support (full power on all ports) - 802.3at support (full power on all ports) - Configurable Power levels per port - Visibility into PoE power use	3	2 3 4	Port per ASIC (Oversubscription) Access Port Speed Options	1:1 Available option required - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (SFP) >= Qty 2 - 1 Gbps or 10 Gbps
- 802.3af support (full power on all ports) - 802.3at support (full power on all ports) - 802.3at support (full power on all ports) - Configurable Power levels per port - Visibility into PoE power use	3	2 3 4	Port per ASIC (Oversubscription) Access Port Speed Options Uplink Port Speed Options Media Flexibility Support	1:1 Available option required - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (SFP) >= Qty 2 - 1 Gbps or 10 Gbps MMF >= 220m, SMF >= 10km, IEEE 802.3z-compliant 1000BASE-SX, 1000BASE-LX, 100Base-TX (RJ45), 10GBASE-SR, 10GBASE-LR, 10GBASE-ER, 1000BASE-T
	3	2 3 4 5	Port per ASIC (Oversubscription) Access Port Speed Options Uplink Port Speed Options Media Flexibility Support	1:1 Available option required - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (SFP) >= Qty 2 - 1 Gbps or 10 Gbps MMF >= 220m, SMF >= 10km, IEEE 802.3z-compliant 1000BASE-SX, 1000BASE-LX, 100Base-TX (RJ45), 10GBASE-SR, 10GBASE-LR, 10GBASE-ER, 1000BASE-T
	3	2 3 4 5	Port per ASIC (Oversubscription) Access Port Speed Options Uplink Port Speed Options Media Flexibility Support Configurable Egress Queues	1:1 Available option required - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (SFP) >= Qty 2 - 1 Gbps or 10 Gbps MMF >= 220m, SMF >= 10km, IEEE 802.3z-compliant 1000BASE-SX, 1000BASE-IX , 100BASE-TX (RJ45), 10GBASE-SR, 10GBASE-IR, 10GBASE-ER, 1000BASE-T >= 8 per port including Strict Priority - 802.3af support (full power on all ports) - 802.3at support (full power on all ports) - Configurable Power levels per port
	3	2 3 4 5	Port per ASIC (Oversubscription) Access Port Speed Options Uplink Port Speed Options Media Flexibility Support Configurable Egress Queues	1:1 Available option required - 10/100 Mbps Ethernet - 10/100/1000 Mbps Ethernet - 1 Gbps Ethernet (SFP) >= Qty 2 - 1 Gbps or 10 Gbps MMF >= 220m, SMF >= 10km, IEEE 802.3z-compliant 1000BASE-SX, 1000BASE-IX , 100Base-TX (RJ45), 10GBASE-SR, 10GBASE-IR, 10GBASE-ER, 1000BASE-T >= 8 per port including Strict Priority - 802.3af support (full power on all ports) - 802.3at support (full power on all ports) - Configurable Power levels per port

Stacka	ble Network	Access Switch		
ID	Ref. No.	Primary Attribute	Secondary Attribute	Specification
1	1	Chassis	Type	Fixed Configuration
_	2		19 Inch Rack Mounting	Required
	3	7		- Backplane (no user or uplink ports
				used to stack)
			Charles Constant for AA his hoof that	- Single control-plane
			Stacking Support for Multiple Switches	- Single data-plane
				- Non-Blocking optional
	4	†	Power Input Options	AC
	5	7		Optional
			Redundant Power Option (1:1)	High Availability Option: Required Non-Critical Option: Not Required
2	1	Packet Processor	Layer 2 Switching	Non-Blocking
	2		Layer 3 Switching	Non-Blocking
	3		IGMP Snooping & IPv6 MLD v1 & v2	Switched in Hardware
	4		MAC Addresses Per Switch	>=12000
3	1	Port Interfaces		- 10/100 Mbps
			Access Port Options	- 10/100/1000 Mbps
			Access Port Options	- 1 Gbps Ethernet (SFP)
	2		Uplink Port Options	=> Qty 2 - 1 Gbps or 2 - 10 Gbps coppe
			Opilitik Port Options	or fiber
	3			- 12 Port Option
			Per Switch Port Count Options	- 24 Port Option
			Per Switch Port Count Options	- 48 Port Option
	4	†		IEEE 802.3z-compliant 1000BASE-SX,
			CED Mandin Floribility Continue	1000BASE-LX/LH, 1000BASE-T (RJ45),
			SFP Media Flexibility Options	100Base-T(RJ45), 10GBASE-SR, 10GBAS
	5	 		- 802.3af support (24 port & 48 port
	٦			options, capable of supplying power to
				all ports)
				- 802.3at support (24 port & 48 port
			Power over Ethernet Options	options)
				, ,
				- Configurable power levels per port
				- Visibility into PoE power use
	6	†	Configurable Egress Queues	=> 8 per port including Strict Priority
	4 1	Operating System		- IPv4, IPv6,ICMP,OSPF, BGP
				- Virtual Router Redundancy Protocol
				(VRRP)
				- Switching load sharing configurable
				per packet or per session, and per
			Layer 3 Protocols & Features	session is configuration with L3 address
				and L4 ports
				- Protocol Independent Multicast (PIM)
				v1 & v2

10			ID 4.0 (b
2		OSPF Requirements	- IPv4 Open Shortest Path First (OSPF) versions 2 - IPv6 Open Shortest Path First (OSPF) versions 3 - MD5 authentication - Configurable areas, ABRS, and ASBRs - Configurable area types: normal (LSAs 1-5), stubby (LSAs 1-4), totally stubby (LSAs 1-2), Not-So-Stubby Area (NSSA) (LSAs 1-4 & 7), and NSSA totally stubby (LSAs 1-2 & 7) - Configurable router ID - Configurable hello packet interval - Configurable router dead interval - Configurable priority for DR and BDR - Configurable per interface network types (P2P, broadcast, NBMA, and virtual links) - Configurable cost per interface - Configurable cost multiplier - Ability to redistribute static routes and other protocol routes using access lists and route maps
3	BGPv4 Requirements	- Multiprotocol Border Gateway Protocol (BGP) for IPv4 and IPv6 - MD5 authentication - Use all standard attributes - Ability to enable or disable synchronization - Configurable local preference per neighbor - Configurable multi-exit discriminator (MED) per neighbor - Configurable standard and extended communities	
4		Required L2 Features	802.1q, Per-port broadcast, multicast, and unicast storm control, 802.3ad (LACP), Link-Layer Discover Protocol, Jumbo Ethernet Frames with MTU up to 9000 bytes
5	Port Security	- 802.1x Support - MAC Authentication Bypass - Dynamic VLAN Assignment - Configurable number of MAC Addresses allowed per port - Configurable actions to take when violation occurs - Ability to configure MAC address or addresses allowed per port - Ability to learn and stick a MAC Address per port	
6		QoS Features	- 802.1p class-of-service(CoS) classification - Differentiated Services Code Point (DSCP) classification - Support ingress classification, policing, and marking per port - Support egress queuing/scheduling

7	Access Control Lists	- Access lists in hardware - Support for access lists source and destination L2 MAC address, Ethernet types, and SAPs - Support for access lists source and destination L3 addresses with masks and L4 port numbers - Support for prefix lists - Ability to apply L3 access list to L2 interfaces/ports - Ability to police (rate limit) per port, per port channel, per VLAN
8	NTP Support	- Version 3 or greater Required - Configurable NTP Peer and Server Associations - Configurable NTP Authentication - Configurable NTP Access Restrictions - Configurable Source IP Address for NTP packets - Configurable Timezone/Offset - Configurable automatic recurring daylight savings time - Configurable per Interface
9	Unidirectional Link failure detection	Required
10		- Must be able to disable spanning tree per port - Ability to transition immediately to forwarding state per port on edge ports with 802.1d/s/w - Ability to disable topology change notifications per port on edge ports with 802.1d/s/w - STP cost configurable per port (0 to 240) 802.1d & 802.1t - STP priority configurable per VLAN (0 to 61,440) 802.1d & 802.1t - Ability to prevent rogue bridges from becoming the STP root - Ability to prevent an alternate port or a root port from assuming a designated port role due to the absence of BPDUsAbility to configure STP edge ports to disable upon receiving a BPDU
11	Network Management	- Centralized AAA w/ Role Based Authorization, Syslog, SNMP v2c, v3, SNMP Traps, SSH, Telnet, Radius or similar - Ability to disable telnet, ftp, http, https - IPv6 Support - Secure console port with roles based AAA authentication - Configurable Console & VTY timeout - Ability to define and apply IP access control lists to VTY sessions - Out of Band Ethernet Management Port - Optional - DNS support for resolution of user- defined device names
12	Multi chassis Management Interfers A	Required
	เงเนเน-cnassis ivianagement Interface Aggregation	
	Cross-Stack Link Aggregation	Required: must be capable to support defining link aggregation across multiple switches within a stack
	9 10 11	Access Control Lists NTP Support Unidirectional Link failure detection 802.1d Required Spanning Tree Features Network Management Network Management Interface Aggregation

14			- Support for SNMPv2C, & SNMPv3
			- Support for traps that is an agent on
			the switch to send an unsolicited
			notifications to the SNMP manager for a
			configured event.
			- Configurable source IP address or
			interface for traps.
			- Supports both read-only (RO) and read-
		SNMP Features	write (RW) community strings
			- Ability to restrict each community
			string to specific IP addresses
			independently
			- Ability to configure different SNMP
			versions for each SNMP manager
			- Support for multiple RO and RW
			community strings
			- Support for multiple SNMP profiles
15		Port Mirroring or similar	Required
16		Remote Port Mirroring or similar	Required
17		Software Image Management	TFTP, FTP
18		Configuration File Management	TFTP, FTP
19			>= 255 VLAN's
		VLAN Support	>= 1000 VLAN ID's
20			S I B I'm I'm IB
20			- Source and Destination IP
		Data Traffic Rate Limiting	- Layer 4 TCP and UDP
		, and the second	- Source and Destination MAC
21		VOIP Features	Configurable Voice-VLAN
22			- Configurable log history size
			- Configurable logging severity
		Message Logging Buffer	- Configurable log message time stamps
			,
			1

Modula	r LAN Camp	us Core Switch - Configuration		
ID	Ref. No.	Primary Attribute	Secondary Attribute	Specification
1	1	Chassis	Туре	Modular
	2		19 Inch Rack Mounting	Required
	3		Redundant Switch Packet Processor	Required (Online Insertion/Removal)
		+	De la December	Dec. See J.
	5	+	Packet Processor Control Plane Podundancy Support	Required
	6	1	Control Plane Redundancy Support Cooling Redundancy Support	Required Required
	7	†	Power Supply Redundancy Support (1:1)or (N+1)	Required
	8	1	Input Power Options	AC Required
	9		Online Insertion/Removal Hot-Swappable	Required
	10	1	Multi-Chassis Link Aggregation Support	Required
2	1	Operating System Features	Protocols switched in hardware	IPv4, IPv6, IGMP Snooping, IPv6 MLD v1 & v2
	2		Layer 3 Protocols & Routing Features	- IPv4, IPv6,ICMP,OSPF, BGP - Virtual Router Redundancy Protocol (VRRP) - Routing Engine Fast failover - Switching load sharing configurable per packet or per session, and per session is configuration with L3 address and L4 ports - Protocol Independent Multicast (PIM) v1 & v2
	3		OSPF Requirements	- IPv4 Open Shortest Path First (OSPF) versions 2 - IPv6 Open Shortest Path First (OSPF) versions 3 - MD5 authentication - Configurable areas, ABRS, and ASBRs - Configurable area types: normal (LSAs 1-5), stubby (LSAs 1-4), totally stubby (LSAs 1-2), Not-So-Stubby Area (NSSA) (LSAs 1-4 & 7), and NSSA totally stubby (LSAs 1-2 & 7) - Configurable router ID - Configurable router ID - Configurable router dead interval - Configurable priority for DR and BDR - Configurable per interface network types (P2P, broadcast, NBMA, and virtual links) - Configurable cost per interface - Configurable cost multiplier - Ability to redistribute static routes and other protocol routes using access lists and route maps
	4		BGPv4 Requirements	- Multiprotocol Border Gateway Protocol (BGP) for IPv4 and IPv6 - MD5 authentication - Use all standard attributes - Ability to enable or disable synchronization - Configurable local preference per neighbor - Configurable multi-exit discriminator (MED) per neighbor - Configurable standard and extended communities
	5		Required L2 Features	802.1q, Per-port broadcast, multicast, and unicast storm control, 802.3ad (LACP), Link-Layer Discover Protocol, Jumbo Ethernet Frames with MTU up to 9000 bytes

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	6	Port Security Requirements	- 802.1x Support - MAC Authentication Bypass - Dynamic VLAN Assignment - Configurable number of MAC Addresses allowed per port - Configurable actions to take when violation occurs - Ability to configure MAC address or addresses allowed per port - Ability to learn and stick a MAC Address per port
	7	QoS Features	- 802.1p class-of-service(CoS) classification - Differentiated Services Code Point (DSCP) classification - Support ingress classification, policing, and marking per port - Support egress queuing/scheduling
	8	Access Control Lists	- Access lists in hardware - Support for access lists source and destination L2 MAC address, Ethernet types, and SAPs - Support for access lists source and destination L3 addresses with masks and L4 port numbers - Support for prefix lists - Ability to apply L3 access list to L2 interfaces/ports - Ability to police (rate limit) per port, per port channel, per VLAN
	9	NTP Support	- Version 3 or greater Required - Configurable NTP Peer and Server Associations - Configurable NTP Authentication - Configurable NTP Access Restrictions - Configurable Source IP Address for NTP packets - Configurable Timezone/Offset - Configurable automatic recurring daylight savings time - Configurable per Interface
	10	Unidirectional Link failure Detection	Required
	11	802.1d Required Spanning Tree Features	- Must be able to disable spanning tree per port - Ability to transition immediately to forwarding state per port on edge ports with 802.1d/s/w - Ability to disable topology change notifications per port on edge ports with 802.1d/s/w - STP cost configurable per port (0 to 240) 802.1d & 802.1t - STP priority configurable per VLAN (0 to 61,440) 802.1d & 802.1t - Ability to prevent rogue bridges from becoming the STP root - Ability to prevent an alternate port or a root port from assuming a designated port role due to the absence of BPDUs Ability to configure STP edge ports to disable upon receiving a BPDU

	12			
			Network Management	- Centralized AAA w/ Role Based Authorization, Syslog, SNMP v2c, v3, SNMP Traps, SSH, Telnet, Radius or similar - Ability to disable telnet, ftp, http, https - IPv6 Support - Secure console port with roles based AAA authentication - Configurable Console & VTY timeout - Ability to define and apply IP access control lists to VTY sessions - Out of Band Ethernet Management Port -Optional - DNS support for resolution of user- defined device names
	13		SNMP	- Support for, SNMPv2C, & SNMPv3 - Support for traps that is an agent on the switch to send an unsolicited notifications to the SNMP manager for a configured event Configurable source IP address or interface for traps. Supports both read-only (RO) and readwrite (RW) community strings - Ability to restrict each community string to specific IP addresses independently - Ability to configure different SNMP versions for each SNMP manager - Support for multiple RO and RW community strings - Support for multiple SNMP profiles
	14		Port Mirroring or similar	Required
	15		Remote Port Mirroring or similar	Required
	16		Configuration File Management	TFTP, FTP
	17		Software Image Management	TFTP, FTP
3	1	Line-cards / Port Interfaces	Online Insertion/Removal Support	Required
	2		Connection to Switch Fabric	=< 2:1 oversubscription
	3		Configurable Egress Queues	>= 8 per port including Strict Priority
	4		1 GbE Fiber port count	Minimum 144 count 1 GbE Fiber Ports (100 SX Optics) (44 LX/LH Optics)
	5		100/1000 port count	Minimum (48) 100/1000 Copper RJ45 ports
	6		10 GigE Port count	Minimum (2) 10 GigE Ports

High Der	sity Modul	ar LAN Access Switch - Configuration		
	1 -		T	T
ID	Ref. No.	Primary Attribute	Secondary Attribute	Specification
1	1	Chassis	Туре	Modular
	2		19 Inch Rack Mounting	Required
	3		System Throughput	Non-Blocking
	4		Packet Processor Redundancy	Required
	5		Packet Processor	Layer-3 Switching: Non-Blocking
	-		Capling Redundancy Cuppert	Layer-2 Switching: Non-Blocking
	7		Cooling Redundancy Support	Required
			Power Supply Redundancy Support (1:1)or (N+1)	Required AC
	9		Input Power Options Online Insertion/Removal Hot-Pluggable Slot	
2	1	Operating System Features	Offiline insertion/ Kemovai Hot-Pluggable Slot	Required IPv4, IPv6, IGMP Snooping, IPv6 MLD v1
2	1	Operating System Features	Protocols switched in hardware	& v2
	2		Hot Swannahla Insertion/Removal Support	Required
		•	Hot Swappable Insertion/Removal Support	- IPv4, IPv6,ICMP,OSPF, BGP
	3		Layer 3 Protocols & Routing Features	- Virtual Router Redundancy Protocol (VRRP) - Switching load sharing configurable per packet or per session, and per session is configuration with L3 address and L4 ports - Protocol Independent Multicast (PIM) v1 & v2
	4		QoS Features	- 802.1p class-of-service(CoS) classification - Differentiated Services Code Point (DSCP) classification - Support ingress classification, policing, and marking per port - Support egress queuing/scheduling
	5	Access Control Lists	- Access lists in hardware - Support for access lists source and destination L2 MAC address, Ethernet types, and SAPs - Support for access lists source and destination L3 addresses with masks and L4 port numbers - Aupport for prefix lists - Ability to apply L3 access list to L2 interfaces/ports - Ability to police (rate limit) per port, per port channel, per VLAN	
	6		Port Security	- 802.1x Support - MAC Authentication Bypass - Dynamic VLAN Assignment - Configurable number of MAC Addresses allowed per port - Configurable actions to take when violation occurs - Ability to configure MAC address or addresses allowed per port - Ability to learn and stick a MAC Address per port
	7		Unidirectional Link failure Detection	Required

			10 10 01 1 10 1 51 1 (0005)
8		OSPF Requirements	- IPv4 Open Shortest Path First (OSPF) versions 2 - IPv6 Open Shortest Path First (OSPF) versions 3 - MD5 authentication - Configurable areas, ABRS, and ASBRS Configurable area types: normal (LSAS 1-5), stubby (LSAS 1-4), totally stubby (LSAS 1-2), Not-5o-5tubby Area (NSSA) (LSAS 1-4, and NSSA totally stubby) (LSAS 1-2, and NSSA totally stubby) (LSAS 1-2 & 7) - Configurable router ID - Configurable hello packet interval - Configurable priority for DR and BDR - Configurable priority for DR and BDR - Configurable per interface network types (P2P, broadcast, NBMA, and virtual links) - Configurable cost per interface - Configurable cost multiplier - Ability to redistribute static routes and other protocol routes using access lists and route maps
9		BGPv4 Requirements	- Multiprotocol Border Gateway Protocol (BGP) for IPv4 and IPv6 - MD5 authentication - Use all standard attributes - Ability to enable or disable synchronization - Configurable local preference per neighbor - Configurable multi-exit discriminator (MED) per neighbor - Configurable standard and extended communities
1		Required L2 Protocols & Features	- 802.1q - Per-port broadcast, multicast, and unicast storm control - 802.3ad (LACP) - Link-Layer Discover Protocol - Jumbo Ethernet Frames with MTU up to 9000 bytes
1		802.1d Spanning Tree Features Required	- Must be able to disable spanning tree per port - Ability to transition immediately to forwarding state per - port on edge ports with 802.1d/s/w - Ability to disable topology change notifications per port on edge ports with 802.1d/s/w - STP cost configurable per port (0 to 240) 802.1d & 802.1t - STP priority configurable per VLAN (0 to 61,440) 802.1d & 802.1t - Ability to prevent rogue bridges from becoming the STP root - Ability to prevent an alternate port or a root port from assuming a designated port role due to the absence of BPDUs Ability to configure STP edge ports to disable upon receiving a BPDU
1	2	VOIP Features	Configurable Voice-VLAN

		Network Management	- Centralized AAA w/ Role Based Authorization, Syslog, SNMP v2c, v3, SNMP Traps, SSH, Telnet, Radius or Similar - ability to disable telnet, ftp,HTTP, HTTPS - IPv6 Support - Secure console port with roles based AAA authentication - Configurable Console & VTY timeout - Ability to define and apply IP access control lists to VTY sessions - Out of Band Ethernet Management Port-optional - DNS support for resolution of user- defined device names
	14	SNMP	- Support for SNMPv2C, & SNMPv3 - Support for traps that is an agent on the switch to send an unsolicited notifications to the SNMP manager for a configured event Configurable source IP address or interface for traps Supports both read-only (RO) and read-write (RW) community strings - Ability to restrict each community string to specific IP addresses independently - Ability to configure different SNMP versions for each SNMP manager - Support for multiple RO and RW community strings - Support for multiple SNMP profiles
	15	Message Logging Buffer	Configurable log history size Configurable logging severity Configurable log message time stamps
	16	Port Mirroring or similar	Required
	17	Remote Port Mirroring or similar	Required
	18	Software Image Management	TFTP, FTP
	19	Configuration file Backup and Management	TFTP, FTP
	20	NTP Support	- Version 3 or greater Required - Configurable NTP Peer and Server Associations - Configurable NTP Authentication - Configurable NTP Access Restrictions - Configurable Source IP Address for NTP packets - Configurable Timezone/Offset - Configurable automatic recurring daylight savings time - Configurable per Interface
3	1 Linecards / Dort Interfaces	Online Insertion/Removal	Poguirod
3	1 Linecards / Port Interfaces	,	Required
	2	Connection to Switch Fabric	=< 2:1 oversubscription
	3 4	Configurable Egress Queues Power over Ethernet Requirement	>= 8 per port including Strict Priority - 802.3af support (full power on all ports) - 802.3at support (full power on all ports) - Configurable Power levels per port - Visibility into PoE power use
	5	User Access Port Count	Minimum (240) ports of 100/1000 Copper RJ45

Attachment E - Networking Appliances - Switch Specifications

Configuration Item Addendum

6		Uplink Ports Required	Minimum (4) 1 GbE Fiber (LX/LH Optics)
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	Ref. No.	Primary Attribute	I consider an area	1
	1		Secondary Attribute	Specification
		Chassis	Туре	Fixed Configuration
	2	Ī	19 Inch Rack Mounting	Required
Į	3	Ī		- Backplane (no user or uplink ports
				used to stack)
				- Single control-plane
			Stacking Support for Multiple Switches	-
				- Single data-plane
				- Non-Blocking optional
		+	2 (1 1 1 1 (1 1 1)	
	4	 	Power Supply Redundancy (1:1 or n+1)	Required
	5		Power Input Options	AC
-	1	Packet Processor	Layer 2 Switching Throughput (pps)	Non-Blocking
-	2	1	Layer 3 Switching Throughput (pps)	Non-Blocking
	3		IGMP Snooping & IPv6 MLD v1 & v2 in Hardware	Required
	1	Port Interfaces	User Access Port Count	(48) Port 100/1000 RJ45 Copper
	2	1	Uplink Ports	(4) GbE Fiber ports (LX/LH Optics)
	3	Ī		- 802.3af support (all 48 ports)
				- 802.3at support (all 48 ports)
			Power over Ethernet Options	- Configurable power levels per port
			rower over Ethernet Options	
				- Visibility into PoE power use
		+	0.00	
	4		Configurable Egress Queues	=> 8 per port including Strict Priority
4	1	Operating System		- Option for L3 Switching: IPv4,
				IPv6,ICMP, OSPF, BGP
				- Virtual Router Redundancy Protoco
				(VRRP)
			Layer 3 Protocols & Features	- Switching load sharing configurable
				per packet or per session, and per
			session is configuration with L3 addr	
				and L4 ports
				- Protocol Independent Multicast (PI
				v1 & v2
	2			- IPv4 Open Shortest Path First (OSPF
				versions 2
				- IPv6 Open Shortest Path First (OSPI
				versions 3
				- MD5 authentication
				- Configurable areas, ABRS, and ASB
				- Configurable area types: normal (L
				1-5), stubby (LSAs 1-4), totally stubb
				(LSAs 1-2), Not-So-Stubby Area (NSS
				(LSAs 1-4 & 7), and NSSA totally stul
				(LSAs 1-2 & 7)
				- Configurable router ID
			OSPF Requirements	- Configurable hello packet interval
			OSFF Requirements	- Configurable router dead interval
				_
				- Configurable priority for DR and BI
				- Configurable per interface network
				types (P2P, broadcast, NBMA, and
I				virtual links)
Į				- Configurable cost per interface
	1			
		1		- Configurable cost multiplier
			1	
				■ 1 · · · · · · · · · · · · · · · · · ·
				■ 1 · · · · · · · · · · · · · · · · · ·
				 Ability to redistribute static routes other protocol routes using access li and route maps
				1

3	BGPv4 Requirements	- Multiprotocol Border Gateway Protocol (BGP) for IPv4 and IPv6 - MD5 authentication - Use all standard attributes - Ability to enable or disable synchronization - Configurable local preference per neighbor - Configurable multi-exit discriminator (MED) per neighbor - Configurable standard and extended communities
4	Layer 2 Protocols & Features	- 802.1q - Per-port broadcast, multicast, and unicast storm control - 802.3ad (LACP) - Link-Layer Discover Protocol - Jumbo Ethernet Frames with MTU up to 9000 bytes
5	Port Security	- 802.1x Support - MAC Authentication Bypass - Dynamic VLAN Assignment - Configurable number of MAC Addresses allowed per port - Configurable actions to take when violation occurs - Ability to configure MAC address or addresses allowed per port - Ability to learn and stick a MAC Address per port
6	Software Image Update Options	TFTP, FTP
7	Configuration File Backup and Management	TFTP, FTP
8	QoS Features	- 802.1p class-of-service(CoS) classification - Differentiated Services Code Point (DSCP) classification - Support ingress classification, policing, and marking per port - Support egress queuing/scheduling
9	Access Control Lists	- Access lists in hardware - Support for access lists source and destination L2 MAC address, Ethernet types, and SAPs - Support for access lists source and destination L3 addresses with masks and L4 port numbers - Support for prefix lists - Ability to apply L3 access list to L2 interfaces/ports - Ability to police (rate limit) per port, per port channel, per VLAN
10	NTP Support	- Version 3 or greater: Required - Configurable NTP Peer and Server Associations - Configurable NTP Authentication - Configurable NTP Access Restrictions - Configurable Source IP Address for NTP packets - Configurable Timezone/Offset - Configurable automatic recurring daylight savings time - Configurable per Interface
11	Cross-Stack Link Aggregation	Required: must be capable to support defining link aggregation across multiple switches within a stack.

		1	,
12	<u> </u>	Unidirectional Link failure detection	Required
13		Port Mirroring or similar	Required
14		Remote Port Mirroring or similar	Required
15		Multi-chassis Management Interface Aggregation	Required
16		Network Management	- Centralized AAA w/ Role Based Authorization, Syslog, SNMP v2c, v3, SNMP Traps, SSH, Telnet, Radius or similar - Ability to disable telnet, ftp, http, https - IPv6 Support - Secure console port with roles based AAA authentication - Configurable Console & VTY timeout - Ability to define and apply IP access control lists to VTY sessions - Out of Band Ethernet Management port-optional - DNS support for resolution of user- defined device names
17		Message Logging Buffer	- Configurable log history size - Configurable logging severity - Configurable log message time stamps
18		Data Traffic Rate Limiting	- Source and Destination IP - Layer 4 TCP and UDP - Source and Destination MAC
19	1	VOIP Features	Configurable Voice-VLAN
20		SNMP	- Support for SNMPv2C, & SNMPv3 - Support for traps that is an agent on the switch to send an unsolicited notifications to the SNMP manager for a configured event Configurable source IP address or interface for traps Supports both read-only (RO) and readwrite (RW) community strings - Ability to restrict each community string to specific IP addresses independently - Ability to configure different SNMP versions for each SNMP manager - Support for multiple RO and RW community strings - Support for multiple SNMP profiles
21		Required 802.1d Spanning Tree Features	- Must be able to disable spanning tree per port - Ability to transition immediately to forwarding state per port on edge ports with 802.1d/s/w - Ability to disable topology change notifications per port on edge ports with 802.1d/s/w - STP cost configurable per port (0 to 240) 802.1d & 802.1t - STP priority configurable per VLAN (0 to 61,440) 802.1d & 802.1t - Ability to prevent rogue bridges from becoming the STP root - Ability to prevent an alternate port or a root port from assuming a designated port role due to the absence of BPDUs Ability to configure STP edge ports to disable upon receiving a BPDU